

10/628,424

Appl: Read

ARL 01-37

**In the Claims**

The following is a listing of the claims presently presented in this application.

Claims 1 –12 (canceled)

Claim 13 (new): An electrolyte solution for a metal-oxygen battery where oxygen is reduced at a cathode surface to produce  $O^{2-}$  or  $O_2^{2-}$  ions, the electrolyte comprising:

a lithium salt selected from the group consisting of  $LiPF_6$ ,  $LiBF_4$ ,  $LiClO_4$ ,  $LiC(SO_2CF_3)_3$ ,  $LiN(SO_2CF_3)_2$ ,  $LiO_3SCF_2CF_3$ ,  $LiO_3SC_6F_5$ ,  $LiO_2CCF_3$ ,  $LiP(C_6H_5)_4$ ,  $LiCF_3SO_3$ ; and

a non-aqueous solvent comprises a material selected from the group consisting of dimethyl carbonante (DMC), dipropyl carbonate (DPC), diethyl carbonate (DEC), ethyl methyl carbonate (EMC), tetrahydrofuran (THF), and 1,2-dimethoxyethane (DME), wherein the oxygen solubility of the solvent is at least 0.1150 cc  $O_2$ /cc at STP.

Claim 14 (new) A metal-oxygen battery where oxygen is reduced at a cathode to produce  $O^{2-}$  or  $O_2^{2-}$  ions, the battery comprising

a lithium metal-containing anode;

a cathode, for reducing the oxygen; and

an electrolyte solution of a lithium salt selected from the group consisting of  $LiPF_6$ ,  $LiBF_4$ ,  $LiClO_4$ ,  $LiC(SO_2CF_3)_3$ ,  $LiN(SO_2CF_3)_2$ ,  $LiO_3SCF_2CF_3$ ,  $LiO_3SC_6F_5$ ,  $LiO_2CCF_3$ ,  $LiP(C_6H_5)_4$ ,  $LiCF_3SO_3$ ; and

a non-aqueous solvent for the electrolyte selected from the group consisting of dimethyl carbonante (DMC), dipropyl carbonate (DPC), diethyl carbonate (DEC), ethyl

10/628,424

Appl: Read

ARL 01-37

methyl carbonate (EMC), tetrahydrofuran (THF), and 1,2-dimethoxyethane (DME), wherein the oxygen solubility of the solvent is at least 0.1150 cc O<sub>2</sub>/cc at STP.

Claim 15 (new) The metal-oxygen battery of claim 14, wherein the electro-active cathode comprises carbon.

Claim 16 (new) A lithium-oxygen battery where oxygen is reduced at a cathode to produce O<sup>-2</sup> or O<sub>2</sub><sup>-2</sup> ions which react with lithium to produce Li<sub>2</sub>O<sub>2</sub> and Li<sub>2</sub>O that deposit on the cathode, the battery comprising

a lithium metal-containing anode;

a cathode, for reducing oxygen; and

an electrolyte solution of a lithium salt selected from the group consisting of LiPF<sub>6</sub>,

LiBF<sub>4</sub>, LiClO<sub>4</sub>, LiC(SO<sub>2</sub>CF<sub>3</sub>)<sub>3</sub>, LiN(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>, LiO<sub>3</sub>SCF<sub>2</sub>CF<sub>3</sub>, LiO<sub>3</sub>SC<sub>6</sub>F<sub>5</sub>, LiO<sub>2</sub>CCF<sub>3</sub>,

LiP(C<sub>6</sub>H<sub>5</sub>)<sub>4</sub>, LiCF<sub>3</sub>SO<sub>3</sub>; and

a non-aqueous solvent for the electrolyte selected from the group consisting of dimethyl carbonate (DMC), dipropyl carbonate (DPC), diethyl carbonate (DEC), ethyl methyl carbonate (EMC), tetrahydrofuran (THF), and 1,2-dimethoxyethane (DME), wherein the oxygen solubility of the solvent is at least 0.1150 cc O<sub>2</sub>/cc at STP.

Claim 17 (new) The metal-oxygen battery of claim 14, wherein the cathode comprises carbon.